The Muricidae (Gastropoda) from Madeira with the description of a new species of *Ocenebra* (*Ocinebrina*) (Muricidae: Ocenebrinae).

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KEYWORDS: Gastropoda, Muricidae, review, new species, Madeira.

ABSTRACT. Nine species of Muricidae are reported here from the Archipelago of Madeira (*Hexaplex trunculus, Ocenebra erinaceus, O. edwardsi, O. aciculata, O. inordinata* n.sp., *Bedeva paivae, Muricopsis aradasii, Cytharomorula grayi, and Stramonita haemastoma*). Two of these species, *Hexaplex trunculus* and *Bedeva paivae*, are new records for the Archipelago. Three species listed by previous authors remain doubtful records for the region and have not been confirmed [*Muricopsis cristatus, Orania fusulus*, and *Trophonopsis richardi* (= *T. droueti* or *T. muricatus*)]. The presence of *Typhis fistulatus* (= *Typhis sowerbyi*), once recorded from the Archipelago, is probably based on a misidentification, and is not accepted here. A new species, *Ocenebra (Ocinebrina) inordinata*, is described from the Island of Madeira.

RESUME. Neuf espèces de Muricidae sont signalées dans l'Archipel de Madère (*Hexaplex trunculus, Ocenebra erinaceus, O. edwardsi, O. aciculata, O. inordinata* n.sp., *Bedeva paivae, Muricopsis aradasii, Cytharomorula grayi,* et *Stramonita haemastoma*). Deux de ces espèces, *H. trunculus* et *B. paivae* sont signalées pour la première fois dans la région. Trois espèces listées par des auteurs précédents n'ont pas été retrouvées, leur présence dans l'Archipel reste douteuse [*Muricopsis cristatus, Orania fusulus*, et *Trophonopsis richardi* (= *T. droueti* ou *T. muricatus*)]. La présence de *Typhis fistulatus* (= *T. sowerbyi*), signalée précédemment dans l'Archipel est probablement basée sur mauvaise identification de l'espèce et n'est pas acceptée ici. Une nouvelle espèce, *Ocenebra (Ocinebrina) inordinata* est décrite de l'Ile de Madère.

INTRODUCTION

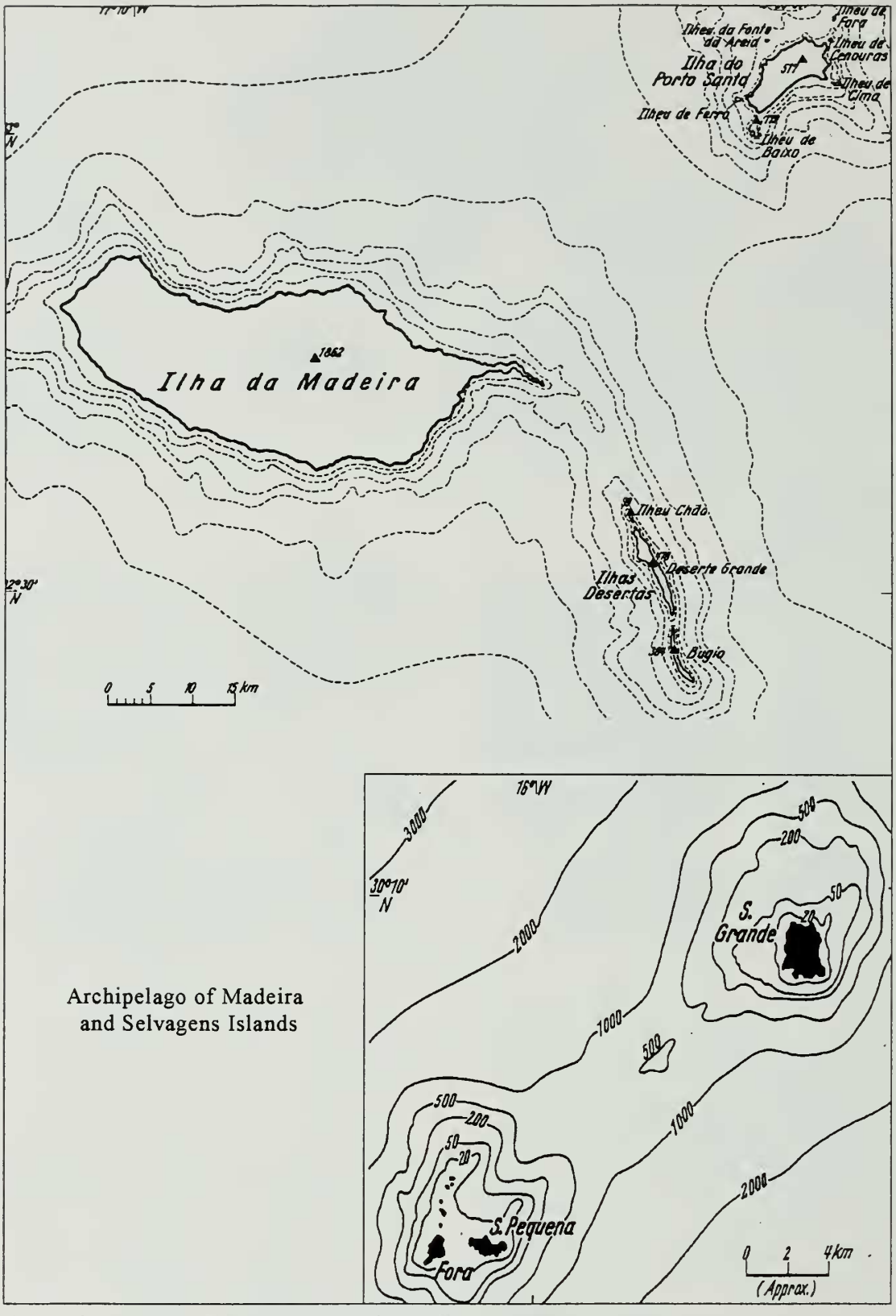
The Archipelago of Madeira is situated between 35°05' - 32°25' N and 17°15' - 16°15' W. It includes Madeira, Porto Santo, the Desertas and a group of islets around these islands. Administratively, the Selvagens Islands, situated 160 miles south of Madeira, between 30°12' - 30°02' N and 16°05' - 15°50' W, also belong to the madeiran archipelago.

The largest island of the archipelago is Madeira, which comprises an area of 737 km^2 and is situated 700 km off the coast of Morocco. Porto Santo is situated 20 miles NE of Madeira and its area is approximately 41 km^2 including the islets. The Desertas are composed of the Ilhéu Chão, Deserta Grande and the Bugio, which are situated 10 miles SE off Madeira and have an area of approximately 14 km^2. The Selvagens have an area of 4 km^2 (Text Fig. 1).

Despite small local and seasonal variations, the Archipelago of Madeira is strongly influenced by a current which flows from NE and is formed by a terminal branch of the Gulf Stream.

The mean temperature at the surface of the water in Madeira is 19.5° C. The lowest is 17.0° C (February and March) and the highest is 22.5° C in September. In the Selvagens the mean values are 0.3° C higher.

Faunal elements of several provinces are represented in the composition of the marine Mollusca of Madeira. There are species from North Africa, Western Mediterranean, NW and NE Atlantic, but also several dozen endemic species. From the biogeographic point of view, the Archipelago of Madeira is a part of Macaronesia which also includes the Azores, the Canary Islands and the Cape Verde Archipelago.



Archipelago of Madeira and Selvagens Islands

(Adapted from Michel-Thomé, 1976 - Geology of the Middle Atlantic Island)

The actual known total of the marine molluscan fauna of Madeira is about 500 species. The first author giving a general view of this matter was WATSON (1897) with a list containing 382 species. Later, NOBRE (1937) added 13 species to Watson's list. Apart from these two authors, NORDSIECK & TALAVERA (1979) have made a general study which, however, was only devoted to the Gastropoda. More recently, MOOLENBEEK & FABER (1987 a-c) and MOOLENBEEK & HOENSELAAR (1989) have dedicated special attention to the Rissoidae, describing some new species.

The family Muricidae in Madeira is represented by several species, but not all the species reported by previous authors were rediscovered by us. Of course, it does not mean *ipso facto* that these do not occur in Madeira at all, and later reports perhaps will confirm the presence of these in the Archipelago.

Abbreviatons

BMNH: The Natural History Museum, London.
MMF: Museu Municipal do Funchal, Madeira.
RH: Roland Houart collection.

SYSTEMATICS

Family MURICIDAE Rafinesque, 1815
Subfamily Muricinae Rafinesque, 1815
Genus *Hexaplex* Perry, 1811

Hexaplex trunculus (Linné, 1758)
Figs 1-2

Murex trunculus Linné, 1758: 747.

Records: Madeira (Garajau); Porto Santo; Desertas Is, many live and dead taken specimens at a depth of approximately 70 m. (MMF).

Remarks: *Hexaplex trunculus* is a very common species occuring in the Mediterranean Sea. The species was not reported before from the Madeira Archipelago, despite the fact that it is very common in Madeira and the other islands.

There are at least 40 synonyms known for this variable species, most of them named to designate minor morphological differences in shell structure such as the length of spines, the dimensions, the colour, etc.

Subfamily MURICOPSINAE
Radwin & D'Attilio, 1971
Genus *Muricopsis*
Bucquoy & Dautzenberg, 1882

Subgenus *Muricopsis*

Muricopsis (Muricopsis) cristatus
(Brocchi, 1814)

Murex cristatus Brocchi, 1814: 394, pl.7, fig.15.

Records: NOBRE, 1937: Funchal.

Remarks: As noted above, Muricopsis cristatus was listed in NOBRE (1937), but it is not yet recorded by us from the Archipelago. Its presence in Madeira, even if doubtful, is possible. The species is common in the Mediterranean Sea.

Subgenus *Murexsul* Iredale, 1915

Muricopsis (Murexsul) aradasii
(Monterosato, 1883)
Figs 3-4

Murex aradasii Monterosato in Poirier, 1883: 123.

Murex (Ocinebra) medicago Watson, 1897: 242, pl. 19, fig. 11.
Murex medicago -NOBRE, 1937: 29
Muricopsis medicago -NORDSIECK & GARCIA-TALAVERA: 131.

Records: Only a few specimens from Madeira (Caniçal) and Porto Santo (MMF); WATSON, 1897 (as *M. medicago* n.sp.): Madeira, Punta de Lourenço to 50 fms. (91 m); Magdalena (dredged); Selvagem Grande, shore; NOBRE, 1937 (as *M. medicago*): same as above, and Funchal; NORDSIECK & GARCIA-TALAVERA, 1979 (as *M. medicago*): Madeira.

Remarks: No live specimens but only fresh dead specimens have been recorded until now by us. The species is apparently rare in the Archipelago (as it generally is elsewhere). There are only a few synonyms, amongst them *Murex medicago* Watson, 1897, described from Madeira.

Subfamily ERGALATAXINAE
Genus *Cytharomorula* Kuroda, 1953

Cytharomorula grayi (Dall, 1889)
Figs 5-6

Nassarina grayi Dall, 1889: 183, pl. 32, fig. 12a.

Trophon lowei Watson, 1897: 244, pl. 19, fig. 12.
Trophon lowei -Nobre, 1937: 28.
Urosalpinx lowei -Nordsieck & Garcia-Talavera, 1979: 134.

Records: Some live and dead taken specimens from Madeira (with no precise locality data, and Funchal Bay) and from Porto Santo, up to 100 m. depth (MMF); Watson, 1897 (as *Trophon lowei* n.sp.): Madeira, 50 fms (91 m) (Labra and Punta de São Lourenço); Nobre, 1937 (as *T. lowei*): same as above; Nordsieck & Garcia-Talavera (as *Urosalpinx lowei*): Madeira.

Remarks: *Nassarina grayi* was described from Barbados (West Atlantic), *Trophon lowei* from Madeira and a third synonym, *Cantharus laevis* Smith, 1891, was described from St. Helena. The species is also known from the Canary Islands. It is now classified in the Muricidae, subfamily Ergalataxinae, due to morphological affinities of shell and radular characters with other species of the subfamily. The geographical distribution is probably world-wide because closely related specimens, probably belonging to the same species, have been recorded from the Indian and Pacific Oceans.

Genus *Orania* Pallary, 1900

Orania fusulus (Brocchi, 1814)

Murex fusulus Brocchi. 1814: 409, pl.8, fig.9.

Records: Nobre, 1937: Funchal; Porto Santo; Nordsieck & Garcia-Talavera, 1979: Madeira.

Remarks: The species is not yet recorded by us, but its presence in Madeira is not doubted due to its presence from the Mediterranean Sea to Angola (West Africa).

Subfamily OCENEBRINAE
Cossmann, 1903
Genus *Ocenebra* Gray, 1847

Ocenebra erinaceus (Linné, 1758)
Fig. 7

Murex erinaceus Linné, 1758: 748.

Murex (Ocinebra) erinaceus -Watson, 1897: 294.
Murex erinaceus -Nobre, 1937: 28.
Ocenebra erinaceum -Nordsieck & Garcia-Talavera, 1979: 132.

Records: Madeira (many localities); Porto Santo; Desertas Is, many live and dead taken specimens (MMF); Watson, 1897: from Funchal to East point and Porto Santo (abundant); Nobre, 1937: same remarks as above; Nordsieck & Garcia-Talavera, 1979: Porto Santo.

Remarks: The species is common in the Archipelago. It is also common in the Eastern Atlantic and the Mediterranean sea, with a lot of synonyms, because of the many shell variations.

Subgenus *Ocinebrina* Jousseaume, 1880

Ocenebra (Ocinebrina) edwardsi (Payraudeau, 1826)
Figs 9-10

Purpura edwardsi Payraudeau, 1826: 155, pl. 7, fig. 19, 20.

Murex (Ocinebra) edwardsii -Watson, 1897: 294.
Murex edwardsi -Nobre, 1937: 28.
Ocinebrina edwardsi -Nordsieck & Garcia-Talavera: 133.

Records: Madeira (loc.inc.) (MMF); Watson, 1897: from Funchal westwards. Very abundant; Nobre, 1937: Funchal, Porto Santo; Nordsieck & Talavera, 1979: Madeira.

Remarks: Numerous specimens are present in the collections of the Museum of Funchal, all from Madeira, but with no precise locality data. The species is widely dispersed in the Mediterranean and the East Atlantic Ocean, and many forms have been named. All specimens examined from Madeira are strongly spirally sculptured, with low, broad axial varices.

Ocenebra (Ocinebrina) aciculata (Lamarck, 1822)
Fig. 8

Murex aciculatus Lamarck, 1822: 176

Murex (Ocinebra) aciculatus -WATSON, 1897: 294.
Murex aciculatus -NOBRE, 1937: 29.
Ocinebrina aciculata -NORDSIECK & GARCIA-TALAVERA, 1979: 133.

Records: Madeira (Ponta Gorda), Porto Santo and the Desertas Is (common) (MMF); WATSON, 1897: from Madalena to island's East point and Porto Santo; NOBRE, 1937: from Madalena to East point; Porto Santo; Funchal, Pontinha; Porto Santo; NORDSIECK & TALAVERA, 1979: Madeira.

Remarks: A small species, reaching a maximum length of 15 mm. It is common in the Eastern Atlantic and the Mediterranean Sea. It is not variable morphologically, however some form names have been proposed for smaller, larger, or more colourful specimens.

Ocenebra (Ocinebrina) inordinata n.sp.
Figs 11-13

Type material: Madeira Is (no other locality data), **holotype** MMF 25429, 19.2 mm; 1 paratype coll. R. Houart, 14.2 mm; 1 paratype coll. J. Verstraeten, 21 mm.

Description: Shell medium sized for the subgenus, up to 21 mm in length at maturity, heavy, tuberculate. Spire high with 1.25-1.50 protoconch whorls and up to 6 shouldered, strongly nodose teleoconch whorls. Suture appressed. Protoconch whorls rounded, weakly elongate, smooth; terminal varix very shallow, nearly straight.

Axial sculpture consisting of ridges and varices: 12 low axial ridges on first teleoconch whorl; 11 on second whorl; 10 or 11 low to high ridges on third whorl; 9 high, strong ridges on 4th whorl; 7 high ridges, and varices on 5th whorl; last teleoconch whorl with 4 or 5 erratically placed varices, some with low, blunt open spines, and one or two high, strong axial node.

Spiral sculpture consisting of 2 nodose cords on first teleoconch whorl; 2 primary cords and 1 secondary cord on the shoulder on second whorl; third to fifth teleoconch whorls with 2 primary cords and narrow threads between them, some 2 or 3 additional threads on shoulder; last teleoconch whorl with 5 or 6 low, obsolete cords, forming short, rounded, broadly open spines on the varices, chiefly on apertural varix. Occasionally with 2 or 3 low, shallow threads between cords.

Aperture ovate, moderately large. Columellar lip smooth, margin partially weakly erect, adherent at adapical extremity. Anal notch broad. Outer lip erect, smooth, with 5 or 6 strong nodes within, adapical node strongest.

Siphonal canal short, narrow, straight, closed, smooth.

Shell entirely light brown; aperture glossy white.

Remarks: We are aware of the great diversity of forms existing in the *Ocenebra (Ocinebrina) edwardsi* group of shells, but *O. inordinata* does not fit any of these forms. A great number (more than 500 specimens) of *O. edwardsi* were observed from different localities, representing many varieties (both colour and morphological forms). Moreover, the varieties of *O. edwardsi* are generally mixed, and many forms live together in the same region. We also examined more than 200 specimens of *O. edwardsi* from Madeira, all are very similar morphologically.

Ocenebra inordinata constantly differs in its completely white aperture, in the few, strong nodes on its last whorl, and in the erratically placed varices with blunt, broad, open spines. One form of *O. edwardsi* (valid taxon?) from Vigo (Spain) has a completely white aperture, with a white shell, but it differs strongly morphologically from *O. inordinata*. That shell was illustrated by ROLAN (1983: 231) as *Ocinebrina* cf. *nicolai* (Monterosato, 1884).

From *O. miscowichi* (Pallary, 1920), a species occuring off the North-West African coast, *O. inordinata* differs in its white aperture, stronger and higher axial sculpture, in its erratically placed varices, and in its fewer, broader spiral cords.

Other species of European or West African Ocenebra or Ocinebrina are very different and need not to be compared.

Etymology: *inordinata* (Latin): not arranged, disorderly. Named for the erratically placed varices and axial ridges.

Genus *Bedeva* Iredale, 1924

Bedeva paivae (Crosse, 1864)
Figs 15-17

Trophon paivae Crosse, 1864: 278.

Records: Madeira, Funchal Harbour, 0-10 m, many specimens.

Remarks: *Bedeva paivae* was originally restricted to Australia, from South Queensland to Shark Bay, West Australia, and in Tasmania (WELLS & BRYCE, 1986). KILBURN & RIPPEY (1982: 91) recorded the species from the eastern Cape Province (South Africa) where it lives in colonies of up to 72 individuals per square meter. *Bedeva paivae* was also collected alive in the Canary Islands (GOMEZ, 1983). It is obvious that the species was introduced to South Africa, to the Canary Islands, and now to the Archipelago of Madeira in the hull of ships (oil tankers, merchant ships...), as already noted in KILBURN & RIPPEY (1982) and in GOMEZ (1983). The presence of *B. paivae* in the Archipelago of Madeira was never reported before. It is apparently very common but not outside of the harbour. The first known specimen was collected by Nicolas Vassart.

The classification of *Bedeva* in the Ocenebrinae is tentative and based on the observation of radular morphology (Vokes, pers. comm.).

Subfamily TROPHONINAE
Genus *Trophonopsis*
Bucquoy & Dautzenberg, 1882

Trophonopsis richardi
(Dautzenberg & Fischer, 1896)

Trophon richardi Dautzenberg & Fischer, 1896: 438, pl. 18, fig. 6.

Records: NORDSIECK & GARCIA-TALAVERA, 1979: Madeira.

Remarks: No recent record is known for this species. Moreover, the real identity of the recorded species in NORDSIECK & GARCIA-TALAVERA (1979: 132) is very doubtful because of the confusion existing between *Trophonopsis muricatus* (Montagu, 1803) and *Trophonopsis richardi* (Dautzenberg & Fischer, 1896) (= *Trophon droueti* Dautzenberg, 1889) (HOUART, 1981: 33). The presence of *T. droueti* or *T. muricatus* in the Archipelago thus remains doubtful.

Subfamily TYPHINAE
Genus *Typhis* Montfort, 1810
Subgenus *Typhinellus* Jousseaume, 1880

Typhis (Typhinellus) fistulatus
(Risso, 1826)

Murex fistulatus Risso, 1826: 191 (not *Muricites fistulatus* Schlotheim, 1820 = *Lyrotyphis*).

Typhis sowerbii Broderip in Broderip & Sowerby 1833: 178.

Records: NORDSIECK & GARCIA-TALAVERA, 1979: Madeira (as *Typhis sowerbyi* Broderip, 1833).

Remarks: The record of this species in Madeira is probably based on a misidentification. The specimen in the possession of Garcia-Talavera (from the Canary Islands) is an example of *Typhis (Typhina) belcheri* Broderip, 1833. Moreover, Garcia-Talavera (pers. comm.) has no material from Madeira. The presence of *Typhis fistulatus* in the Archipelago of Madeira is rejected here.

Subfamily RAPANINAE (ex Thaidinae)
Genus *Stramonita* Schumacher, 1817

Stramonita haemastoma (Linné, 1767)
Fig. 14

Buccinum haemastoma Linné, 1767: 1202.

Purpura haemastoma -WATSON, 1897: 306.
Purpura haemastoma -NOBRE, 1937: 30.
Thais haemastoma -NORDSIECK & GARCIA-TALAVERA, 1979: 132.

Records: Many live and dead taken specimens from the Desertas Is and the Selvagens Is (MMF); WATSON, 1897: Everywhere, very common; NOBRE, 1937: Porto da Cruz, Funchal, Porto Santo, Zimbral; NORDSIECK & GARCIA-TALAVERA, 1979: Madeira.

Remarks: *Stramonita haemastoma* is variable and is recorded from both the eastern and western Atlantic. It also occurs all along the West African coast, as well as in the Mediterranean Sea. Many synonymous names and a few subspecies have been proposed for this species.

Acknowledgements. We wish to express our sincere thanks to F. Garcia-Talavera (Santa Cruz De Tenerife, Canary Is.) and Johan Verstraeten (Oostende, Belgium), for lending material from their collections, and to E.H. Vokes (Tulane University, New Orleans, U.S.A.) for critical reading of the manuscript.

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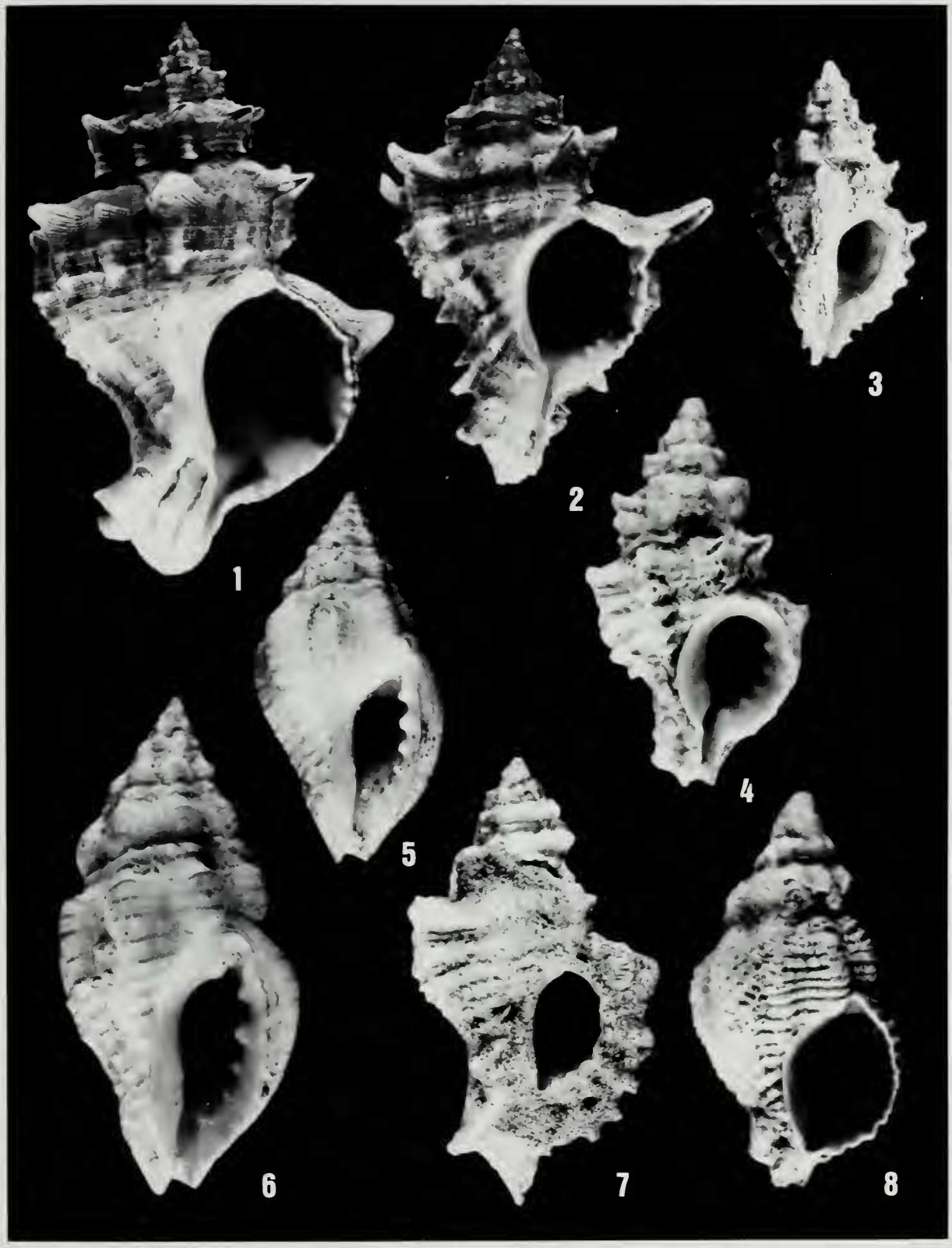
Figures 1-8 (opposite page).

1-2. *Hexaplex trunculus* (Linné, 1758), Madeira, Garajau, 70, MMF.
1. 83.3 mm.
2. 41.2 mm.
3-4. *Muricopsis (Murexsul) aradasii* (Monterosato, 1883).
3. *Murex medicago* Watson, 1897. Holotype BMNH 1911.7.17.3, 13.5 mm.
4. Madeira, Caniçal, MMF JSL-3004, 13 mm.
5-6. *Cytharomorula grayi* (Dall, 1889).
5. *Trophon lowei* Watson, 1897. Holotype BMNH 1911.7.17.2, 19 mm.
6. Madeira (no other locality data), MMF, 19.5 mm.
7. *Ocenebra erinaceus* (Linné, 1758), Madeira (no other locality data), MMF 24702, 44.1 mm.
8. *Ocenebra (Ocinebrina) aciculata* (Lamarck, 1822), Madeira Arch., Desertas, MMF 25160, 10.8 mm.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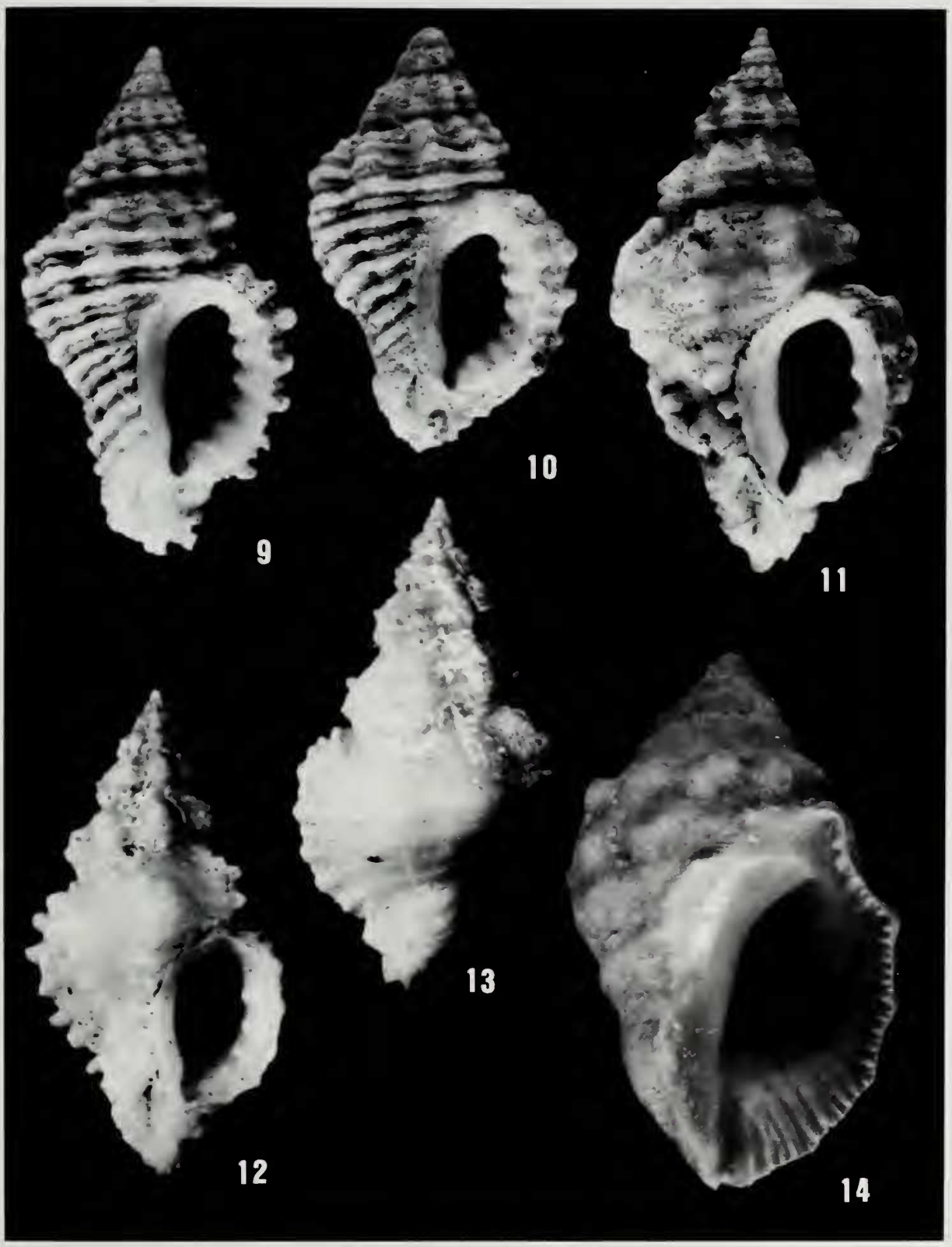
Figures 9-14 (opposite page).

9-10. *Ocenebra (Ocinebrina) edwardsi* (Payraudeau, 1826), Madeira (No other locality data), MMF 24631. 9: 17 mm. 10: 14 mm.
11-13. *Ocenebra (Ocinebrina) inordinata* n.sp.
11. Holotype MMF 25429, 19.2 mm.
12-13. Paratype coll. J. Verstraeten, 21 mm.
14. *Stramonita haemastoma* (Linné, 1767), Madeira Arch., Selvagens, MMF 14332, 60.3 mm.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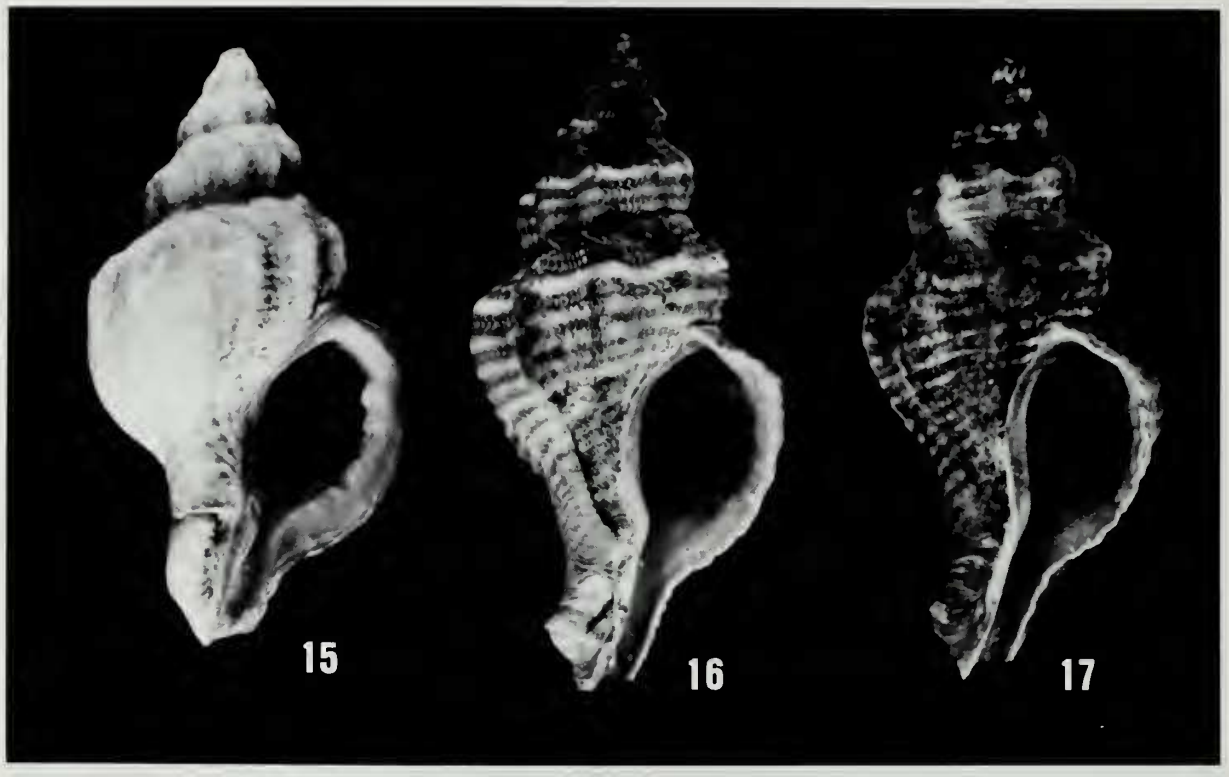

Figures 15-17.

15-17. *Bedeva paivae* (Crosse, 1864).
15. Syntype BMNH 1870.10.26.70, 24 mm.
16-17. Funchal Harbour, Funchal, Madeira Arch., RH, 16: 19.2 mm; 17: 16.8 mm.